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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/588,471

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EXAMINER

KATAKAM, SUDHAKAR

ART UNIT

PAPER NUMBER

1621

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,471	Applicant(s) GAREL ET AL.	
	Examiner SUDHAKAR KATAKAM	Art Unit 1621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 36-68 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 36-68 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 51 is objected to because of the following informalities: claim 51 is depend on cancelled claim. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 36-68 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the solvents o-DCB and Ph-CN, does not reasonably provide enablement for all of applicants broadly claimed organic medium. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with the claims.

With regard to rejection under 35 USC 112 first paragraph, the following factors have been carefully considered (In re Wands, 8 USPQ2d 1400; CAFC, 1988):

1. The nature of the invention,
2. The state of the prior art,
3. The predictability or lack thereof in the art,
4. The amount of direction or guidance present,
5. The presence or absence of working examples,
6. The breadth of the claims,
7. The quantity of experimentation needed, and
8. The level of the skill in the art.

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The claimed invention is drawn to a method for the production of fluoroaromatic compound in an organic medium. The claims are extremely broad. The organic medium refers to any hydrocarbon solvent. The claim 1 read all hydrocarbon species.

Applicants have provided no guidance for a method for producing fluoroaromatic compound in an organic medium other than chlorobenzene and Ph-CN. There is no further information or guidance provided regarding how one of skilled person in the art would use other organic solvents to produce fluoroaromatic compound, as broadly claimed.

The examiner will discuss these factors as they apply to the instant invention.

1. Nature of the invention: The claimed invention is drawn to a process for the preparation of a fluoroaromatic compound in an organic medium.

2. Breadth of the claims: In the instant case the claims are extremely broad encompassing the process for the preparation of a fluoroaromatic compound in any organic solvent (medium) from any aromatic compound carrying at least one amino group.

3. State of the prior art:

Tamura et al (Eur.J.Org.Chem., 1998, 725-727) disclose deaminative fluorination of anilines, in which yield is zero when the solvent is Et₂O, n-hexane and C₆H₆ [see Table 1].

Tamura et al also disclose that diazotization reaction did not proceed in the case of 2-aminopyridine [see Table 2].

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4. Amount of guidance provided: Applicants have provided no guidance for using the any organic solvents in the subject other than chlorobenzene and Ph-CN in the specification. Applicants also provided m-toludine, chloro-aminopyridine and substituted quinolines for aromatic amines in the examples. There is no further information or guidance provided regarding how one of skill in the art would use this disclosure to effectively make fluoroaromatic compound using any organic solvent other than aminoaromatic compounds other than in the examples.

5. Presence or absence of working examples: The only working examples are chlorobenzene and Ph-CN with m-toludine, chloro-aminopyridine and substituted quinolines for aromatic amines in the examples. No other direction is given for any organic solvent of any specific condition.

6. Ordinary skill in the art: The ordinary skill in the art is high.

7. Amount of experimentation necessary: In light of the state of art, the unpredictability of the art and amount of guidance provided, as discussed above, the amount of experimentation necessary to practice the current methods is undue. While one may expect to be able to prepare fluoroaromatic compound, one of ordinary skill in the art would have to perform experimentation to determine which organic solvent if any are effective in the process. The amount of experimentation necessary to identify useful solvent in the preparation of fluoroaromatic compound is not a routine.

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Based on the foregoing reasons, the examiner concludes that undue experimentation is required to use the claimed invention commensurate in scope to these claims.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 61 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 61 recites "R_o representing...." in the claim language. However, R_o is not shown in the formula. Therefore, it is impossible to determine the metes and bounds of the claimed subject matter. Claim 61 is therefore rendered indefinite.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
8. Claims 36-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Milner** (EP 0 430 434 A2) in view of **Doyle et al** (J.Org.Chem.,1979, vol.44, no.9, pages 1572-1574).

Milner teaches a process for the preparation of fluoroaromatic and fluoroheteroaromatic compounds by reacting the corresponding aromatic or heteroaromatic amines with a nitrosyl polyfluoro salt in an inert liquid and decomposing the derived aryl or heteroaryl diazonium polyfluoro salt in situ [see page 2, lines 30-33]. **Milner** says "by the term 'in situ' it is meant that the derived diazonium, or bis(diazonium), salt is not isolated from the other reactants used in the present process" [see page 3, lines 47-50].

Milner also teaches that the reaction may be conveniently carried out by dissolving or slurrying the aromatic amine in suitable inert liquid and adding slurry of nitrosyl polyfluoro salt in a suitable inert liquid. Alternatively the amine solution may be added to the nitrosyl polyfluoro salt slurry. The mixture is stirred until the reaction is essentially complete. Where necessary the temperature of the reaction mixture is increased, to effect decomposition to the corresponding fluoroaromatic compound. It is generally necessary to increase the temperature by up to 200°C, preferably from 5°C to 150°C, to effect decomposition [see page 3, lines 39-46 & also see examples]. The diazotization reaction may be carried out at temperatures between -30°C and 20°C, preferably between -20°C and 10°C and especially between -15°C and 5°C [see page 4, lines 13-16].

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Milner teaches suitable aromatic and heteroaromatic amines of the formula (1) represented by $A-(NH_2)_n$, where A is substituted or unsubstituted aromatic or heteroaromatic radical and n is 1 or 2 [see page 2, line 34 through page 3, lines 1 and 10-32; Table 1].

Milner also teaches suitable nitrosyl polyfluoro salts are of the formula (2), represented by $NOZF_x$, where Z is boron and x is from 4 to 6 [see page 3 lines 2-6].

Milner also teaches suitable solvents for the process are aromatic hydrocarbons, haloaromatics, haloaliphatics, ethers and alcohols [see for specific solvent in page 3, line 56 through page 4, line 5 & in the examples].

The differences between **Milner** and instant claims are as follows:

- (i) **Milner** fails to teach the process in presence of a source of BF_3 ;
- (ii) **Milner** fails to teach applicants alkyl nitrite corresponds to formula (II).

With regard to (i) and (ii) of above, in **Milner** teachings include: the fluorine source is also the nitrosation agent since a polyfluorinated nitrosyl salt is used, and this reagent can be formed in situ from alkyl nitrate, from boron trifluoride and from HF [see page 3, lines 42-43]. Nevertheless, these deficiencies are cured by **Doyle et al** teachings in an analogous process. **Doyle et al** teach direct synthesis of arenediazonium tetrafluoroborate salts from aromatic amines, alkyl nitrate, such as tert-butyl nitrate, and boron trifluoride etherate in anhydrous media [see scheme 1 in page 1572 and Experimental Section].

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Doyle et al teach that the boron trifluoride and the initial amine are introduced into the reaction medium before the gradual addition of the nitrosation agent and temperature conditions the process [see Experimental Section].

The obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it is permissible for the examiner to rely on disclosures, which fairly teach embodiments of applicant's invention. The claims require a multitude of elements and it is reasonable for one of ordinary skill in the art to consider these elements being used together. For example, **Milner** fairly teach embodiments of instant claims except boron trifluoride and alkyl nitrate, whereas **Doyle et al** teach use of boron trifluoride and alkyl nitrate in analogous process.

Therefore, it would have been obvious at the time the invention was made to one of ordinary skill in the art to combine the teachings of **Milner** and **Doyle et al**, and to produce applicants' process, with a reasonable expectation of success. Absent any showing of unusual and/or unexpected results, the art obtains the same effect on the synthesis of fluoroaromatic compounds. The expected result would be an improved or alternative synthesis of fluoroaromatic compounds for the chemical industry.

Conclusion

9. No Claim is allowed.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhakar Katakam whose telephone number is 571-272-9929. The examiner can normally be reached on M-F 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Sullivan can be reached on 571-272-0779. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sudhakar Katakam/
Examiner, Art Unit 1621